[illegible]/[illegible]Martin/mk/7830[illegible]/20 Jan 60

JAN 27 1960

[illegible], SAMOS and MIDAS Program Approval

[illegible] AFXDC [illegible]
AFDRD AFOOP

1. This letter supersedes letter, same subject, dated 11 December 1959. In accordance with instructions from SAF (R&D), the development plans for DISCOVERER, SAMOS and MIDAS will be presented to the Director of Defense Research and Engineering at 1400 in Room [illegible] 1006 on 15 February 1960. The operational plans and user relationships for SAMOS and MIDAS will be presented to the Director of Defense Research and Engineering and representatives of the three Services at the same time and place on 17 February 1960. Prior to these presentations, the development plans, operational plans and user relationships will be reviewed and approved by the Air Force Ballistic Missiles Committee on 10 February 1960. They will be reviewed for recommendations to the Air Force Ballistic Missiles Committee by appropriate panels and groups of the Weapons Board on 1 February 1960 and by the Weapons Board on 3 February 1960.

2. DCS/D has responsibility for all staff actions pursuant to the preparation and presentation of the development plans and will advise the ARDC of participation and representation required. In addition, DCS/D will also schedule the Air Staff reviews listed in paragraph 1.

3. DCS/O is assigned the responsibility for all staff actions pursuant to the preparation and presentation of the operational plans and user relationships. Briefings on these subjects will be made immediately following presentation of the development plans at all Air Force reviews listed in paragraph 1. DCS/P&P will ascertain that user relationships with unified and specified commands set forth in subject plans meet the criteria established in basic joint planning documents. Review of user relationships with intelligence agencies will be the responsibility of AFCIN. DCS/O is responsible for advising the SAC and ADC as to the degree of participation or representation required from them during these reviews.

4. Separate logistic plans in accordance with AFR 5-47 are not required at the present time. DCS/M will take appropriate action to advise the AMC and to invite one qualified observer to attend the Air Force Ballistic Missiles Committee meeting noted in paragraph 1.

5. Attendance at the Air Force Ballistic Missiles Committee meeting will

✓ AFDAT Coord
AFCVC
Ofc of Sig AFCCS
AFDAT Read File

#34

be strictly [illegible] Secretary of the [illegible] by the contractor, and [illegible] (MAG, ARDC, AMC). [illegible] Missile [illegible] prior to the meeting of the Committee.

Signed

R. M. MONTGOMERY
Major General, US Air Force
Assistant Vice Chief of Staff

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1960 JAN 28 TIL 19
HQ USAF
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AFDAT AFMDC AFODC AFXPD AFOOP AFORG/IN

~~Col Martin~~ Bozarjian ~~Col Jeffries~~ ~~Estes~~ ~~Col. Neal~~ ~~F. Hodge Col~~

ORUTAI

~~Guthrie~~ ~~Col Kent~~

~~Col Hewitt~~

~~HcDietd~~ ~~OOP-R Col. Andrews~~ ~~H. Smith~~ PL-WR

AFODC AFXDC

~~Col Moore~~

SECRET

AFDAT/Maj Floyd/sas/71791/21 Jan 60

AFDAT

JAN 2 2 1960

Army and Navy Requirements for Development of Surveillance Satellite Systems

Commander, ARDC, Andrews AFB, Maryland

Forwarded herewith are the Department of the Army and Department of the Navy requirements for development of surveillance satellite systems referenced in Amendment No. 16 to ARPA Order No. 9-60, dated 3 December 1959.

File
O/2

JOHN L. MARTIN, JR.
Colonel, USAF
Deputy Assistant for Advanced
Technology, DCS / Development

5 Atch
1. Army Rqmt 1712(A) b
2. Army Rqmt 1712(A) d
3. Army Rqmt 1712(A) e
4. Navy Rqmt IO-09501
5. Navy Rqmt IO-09502

AFDAT
Maj Floyd

✓ AFDAT Coord Cy
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SECRET

ADVANCED RESEARCH PROJECTS AGENCY
WASHINGTON 25, D. C.

DEC 21 1959

MEMORANDUM FOR THE SECRETARY OF THE AIR FORCE

SUBJECT: Army and Navy Requirements for Development of Surveillance Satellite Systems

By Amendment No. 16 to ARPA Order No. 9-60, dated December 3, 1959, responsibility for development work on the SAMOS Project was transferred from the Advanced Research Projects Agency to the Department of the Air Force. As indicated in that Amendment, the Department of the Army and the Department of the Navy documented requirements were to be forwarded under separate cover. Accordingly, they are attached herewith.

As indicated in the transfer directive, further development work on the SAMOS System undertaken by the Air Force should be responsive to the reconnaissance requirements of all three Military Departments. The attached documents thus should serve as a basis for such direct liaison between the Department of the Air Force and the Departments of the Army and Navy as is necessary to ensure that the interests of all will be adequately served.

FOR THE DIRECTOR OF DEFENSE RESEARCH
AND ENGINEERING

A. W. Betts

A. W. Betts
Brig. General, USA
Director

5 Attachments
Army Space Rqm. 1712 (A) c, 5/7/59
Army Space Rqm. 1712 (A) d, 5/7/59
Army Space Rqm. 1712 (A) e, 5/7/59
Ltr fr CNO, Ser 00199P07, 5/18/59 w/encl
Ltr fr CNO, Ser 00177P07, 5/18/59 w/encl

cc: (w/o attachments)
The Joint Staff
Secretary of the Army
Secretary of the Navy

~~SECRET~~

DS 59-4432-A

~~SECRET~~

ADVANCED RESEARCH PROJECTS AGENCY
WASHINGTON 25, D. C.

DEC 21 1959

MEMORANDUM FOR THE SECRETARY OF THE AIR FORCE

SUBJECT: Army and Navy Requirements for Development of Surveillance Satellite Systems

By Amendment No. 16 to ARPA Order No. 9-60, dated December 3, 1959, responsibility for development work on the SAMOS Project was transferred from the Advanced Research Projects Agency to the Department of the Air Force. As indicated in that Amendment, the Department of the Army and the Department of the Navy documented requirements were to be forwarded under separate cover. Accordingly, they are attached herewith.

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FOR THE DIRECTOR OF DEFENSE RESEARCH
AND ENGINEERING

Signed - A. W. Betts

A. W. Betts
Brig. General, USA
Director

5 Attachments
Army Space Rqm. 1712 (A) c, 5/7/59
Army Space Rqm. 1712 (A) d, 5/7/59
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Ltr fr CNO, Ser 00177P07, 5/18/59 w/encl

cc: (w/o attachments)
The Joint Staff
Secretary of the Army
Secretary of the Navy

DS 59-4432 -1/2

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[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

g. Ground equipment must be capable [illegible]

(1) Processing the recovered [illegible]

(2) Providing for rapid inter[illegible]

(3) Storing information in such [illegible] cessed or furnished on demand, by type, i.e., [illegible] locations , etc.

(4) Disseminating information to proper [illegible]

4. (S) Degree of Urgency

a. This system is required now.

b. There is a necessity for providing a broader intelligence base concerning the U.S.S.R. than is now provided. [illegible] of such scope as to preclude adequate and proper assessment of [illegible] posture in industrial and military fields.

[illegible] Requirement
No. 1712(A)d
Date: 7 May 1959

COMBAT SURVEILLANCE SATELLITE SYSTEM

1. (S) General

a. There is an Army requirement for a Combat Surveillance Satellite System to provide operational commanders at field Army level with "real time" information of their immediate areas.

b. The Combat Surveillance Satellite System will perform the following functions:

(1) Combat surveillance.

(2) Target acquisition and location.

(3) Area damage assessment.

c. The Combat Surveillance Satellite System will consist of:

(1) The necessary space vehicles and sensors to permit day and night, all-weather coverage.

(2) The necessary mobile ground equipment to allow:

(a) Receipt, interpretation, and dissemination of information from the satellite.

(b) Orders to be transmitted from the ground to the satellite.

2. (S) Background for Requirement

a. The broad mission of Army forces in war is to bring to bear sufficient power at the decisive point and time to render an enemy's military capability ineffective. Inherent in this mission is the requirement for combat intelligence systems which will permit commanders and staffs at all echelons to:

(1) Arrive at timely decisions in conducting current operations.

~~Regraded CONFIDENTIAL~~
7 MAY 1959

(2) Select targets for effective use of available weapons.

(3) Conduct post-fire damage assessment.

(4) Assist in the preparation of plans and estimates for future operations.

(5) Avoid surprise.

b. The current information collection capability of the Army is limited in two principal respects:

(1) Depth of penetration into enemy territory.

(2) Obscured vision during night or bad weather.

c. Use of aircraft to secure intelligence information will become increasingly more unreliable as air defense systems are improved.

d. Current intelligence systems severely limit the Army's ability to obtain tactical information prior to the outbreak of hostilities.

e. The employment of sensory equipment on space vehicles provides a logical augmentation and extension of current and projected information-collecting sub-systems within the framework of the combat intelligence system. Their use will be coordinated with other sensory sub-systems.

3. (S) Operational Concept

a. Orbits for combat surveillanee satellites should permit repeated observations of pre-selected areas of the earth's surface up to 1,000 nautical miles wide by 1,500 nautical miles long. The altitude of the satellite orbit above this selected area should be as low as possible consistent with acceptable satellite life. Consideration should be given to using an elliptical orbit whose perigee is over the area of primary interest in order to achieve maximum satellite life with minimum degregation of sensor performance.

b. Sufficient satellites should be employed to provide surveillance of the designated area at least once each eight hours with a resolution of at least 15 meters initially with 200 meters desired by 1970. (2?) ?

c. Sensors are required which will give information day or night, under all weather conditions. Initially it may be necessary to have two sets of sensors - one that gives extremely good data during daylight and good weather, and a back-up set of sensors that provides data during night and bad weather conditions.

d. Pictorial type presentation of sensor data will be acceptable initially. The ultimate objective is the incorporation of devices designed to sense the unique characteristics or "signatures" of intelligence targets.

e. Mobile ground equipment, located in the area of the field Army, is required to:

(1) Interrogate and receive information from the satellite during each pass over the area of interest.

(2) Catalog and store information received.

(3) Furnish to an operator, on command, information by type, for example:

(a) Changes in missile launcher locations since last pass.

(b) Complete missile ~~xx~~ launcher locations detected.

(c) Troop movements.

(d) Changes in troop locations ~~x~~ since last pass.

(e) Area damage assessment by location.

(f) Depot locations.

(4) Merge data listed in subparagraph (3) above into an automatic data processing system for display to all interested agencies.

(5) Issue commands to the satellite for minor orbit and attitude corrections.

f. The system should be able to detect and track surface-to-surface missiles for the purpose of launch site location and impact zone predictin and warning.

4. (S) Degree of Urgency

This system should be operational during FY 1963.

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Army Space Requirement

No. 1712 (A) [illegible]

Date 7 May 1959

SIGNAL INTELLIGENCE AND COUNTERMEASURES SATELLITE SYSTEM

1. (S) General

There is an Army requirement for a Signal Intelligence and Countermeasures Satellite System to:

a. Monitor for signal traffic analysis enemy transmissions originating from stations on earth, in space or on the moon.

[redacted]

c. Locate through direction finding [illegible] enemy transmitter stations on earth, in space or on the moon.

[redacted]

e. Monitor US electromagnetic radiations to provide information from which the efficiency of our communications and electronic security can be determined.

2. (S) Background for Requirement

[redacted]

Regraded ~~CONFIDENTIAL~~
7 May 1962

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ARPA Cont. No.

59-4439-D

countermeasures effort can be greatly increased by locating our equipments in space.

b. Hostile satellite-borne electronic systems may be quite vulnerable to jamming or other countermeasures particularly if we can place a countermeasures satellite in orbit near the hostile satellite.

c. Effective monitoring of friendly transmissions to evaluate the effectiveness of our own security can be more efficiently accomplished if the monitoring equipment is placed in special orbit.

3. (S) Operational Concept

a. The Signal Intelligence and Countermeasures Satellite System will consist of a number of space satellites and include the necessary earth "read-out", data reduction and control stations.

b. The satellite vehicle(s) should provide continuous, or near continuous, intercept coverage of designated sections of the earth and of space. Initially two or three satellites spaced in a circular 300 to 400 mile orbit will provide the desired coverage. Later for intercept operations a single satellite in 24 hour orbit will possibly

[redacted]

(1) Correct its attitude about its center of gravity, and its position ~~its-position~~in orbit, and to relocate itself in a favorable position for jamming.

(2) Intercept signals or search over the radio frequency spectrum from 2 megacycles to 30,000 megacycles. The receiver must be capable of being remotely programmed for wide band operations for electronic search missions and for narrow band operations for specific intercept missions or else two separate receivers must be provided.

(3) Transmit data to earth stations and receive and implement modifications to the intercept program or satellite position. The transmitted data will be in a form facilitating data reduction.

(4) Record and store data for retransmission to earth "read-out" stations.

(5) Respond to pulse, amplitude and/or frequency modulation signals.

[redacted]

c. The earth "read-out" stations will contain the necessary equipment to command, interrogate and receive data from the signal intelligence and countermeasures satellite. These stations are responsible for data reduction, analysis and dissemination.

d. Primary target sources for the communications and electronic intelligence system will be:

(1) Those emissions from tactical military networks from division through Army group, and the strategic networks of military districts and ministries.

(2) Those emissions from enemy satellites and other space craft.

[redacted]

[redacted]

4. Degree of Urgency

The Signal Intelligence and Countermeasures Satellite System should be operational as soon as possible and no later than the final quarter of calendar year 1962.

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON 25, D. C.

Op-701C1/crw
Ser 00199P07
18 MAY 1959

SECRET

From: Chief of Naval Operations
To: Distribution List

Subj: Navy Research and Development Plan, Operational Requirement No. IO-09501 (Electronic Reconnaissance Satellite) (U)

Ref: (a) OPNAV Instruction 3900.8 of 29 Apr 1958
(b) DOD Directive No. 5105.15 of 17 Mar 1959 with encls thereto
(c) Dir ARPA memoranda to Service Secretaries of 30 Jul 1958, 26 Aug 1958 and 3 Mar 1959

Encl: (1) Operational Requirement No. IO-09501

1. The responsibilities of the "action", "lead", or "supporting" Bureaus as defined in reference (a) are somewhat modified in the research and development programs for space systems. Reference (b) directs that the responsibility for certain research fields, including earth satellites, is exclusively assigned to the Director of the Advanced Research Projects Agency (ARPA). The Director of ARPA has, by memoranda (ref (c)), authorized the Military Departments to proceed independently in space research within certain monetary limitations.

2. The production and operation of specific equipments in space technology for naval applications remain in the province of the Navy Department. ARPA sponsored research projects will be transferred to the using service after the successful completion of an experimental demonstration of feasibility. At this change-over point ARPA responsibility ends and, for programs of naval interest, the cognizant Bureau should be prepared to undertake normal development functions.

3. Enclosure (1) has been forwarded to the Secretary of Defense for consideration by the Director of ARPA in planning his research and development program.

4. Enclosure (1) is forwarded to the Chief of Naval Research as principal action addressee and to other addressees for information or such action as their interest or responsibility in support of this Operational Requirement may indicate. A request will be made to the Secretary of the Navy for designating the Office of Naval Research as Lead Bureau for this Operational Requirement.

5. The Chief of Naval Research is requested to review the Research and Development program now in progress in ARPA and advise the Chief of Naval Operations of the adequacy of this effort in support of Naval requirements.

K. S. MASTERSON
By direction

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(See page 2)

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DS 59-4432

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Op-52	1
Op-92B3	3
Op-93	1
NAVOBYS	1
HYDRO	1

OPERATIONAL REQUIREMENT No. TO-09501
ELECTRONIC RECONNAISSANCE SATELLITE

1. **OPERATIONAL CONCEPT:**

Current systems of collecting electronic intelligence are peripheral in nature and do not cover many vital areas inside the Soviet Bloc. A relatively simple satellite carrying equipments for intercepting radar and other electronic emissions would provide vital information over interior areas of great military significance at an early date. Since more versatile but more complex systems appear feasible during the next five years early development is an essential element of this concept.

2. **OPERATIONAL REQUIREMENT:**

Develop a satellite system capable of detecting, locating, and processing deliberate and inadvertent electronic transmissions under all weather conditions, emanating from interior and infrequently covered regions controlled by foreign nations in order to provide strategic warning, installation inventory, and installation location in advance of other known systems.

a. Functions required to be performed

(1) All foreign nations are known to use controlled electronic radiations for a wide variety of purposes, e.g., detection, communications, vehicle control, and navigation. The major potential enemies of the United States are on a par with the United States and its Allies in their ability to develop, produce, and use systems for these purposes. The ability of U.S. Intelligence Agencies, to intercept and exploit such radiations is presently limited in both depths and completeness of coverage. It is believed that many of the foreign electronic sites and development facilities are located beyond intercept coverage now provided. There is a requirement to fill this gap in order to learn of technological advanced, provide strategic warning, and assist mission planning. The satellite appears to be one of the most logical systems which can be developed to accomplish this function in a short time period.

(2) This system should provide material and techniques for placing a satellite in orbit, establish the tracking ephemeris, a rapid and automatic means of intercepting and collecting electronic transmissions, and relaying selected data to Navy (including ship and aircraft) and national intercept stations when commanded. Data processing should be capable of being accomplished through existing processing facilities in an interim system.

b. Threat

(1) The known ability of a potential enemy to initiate a limited or all-out war against the free world is a continuing threat. This threat steadily increases as it becomes outwardly apparent that an enemy's capabilities for conducting war are increasing. To effectively counter this threat, detailed intelligence concerning level of enemy electronic activity, type of electronic emissions, and general location of electronic equipments is required. The electronic reconnaissance system needed to provide this information shall consist of a number of components which, when used together, provide a completely comprehensive all-weather system.

ENCLOSURE (1) to CNO
Ser 00199P91 18 MAY 1958

SECRET

c. Performance and limitations

(1) Minimum features acceptable mid-1959 are as follows:

(a) Lifetime of at least 4 to 6 months.

(b) Coverage by a single vehicle of "S" or "X" band with controlled interrogation.

(c) Payload of approximately 50 pounds.

(d) Orbit and trajectory obtainable with THOR or similar boosters using existing facilities.

(e) Utilize existing telemetering, control, and intercept stations.

Additional features desired will be stated in development characteristics.

(2) It is desired, when the payload is capable of being increased sufficiently and the state-of-the-art permits, to cover in one satellite multiple electronic emissions bands. Specific operational performance requirements will be stated in Development Characteristics.

d. Features of desired development work

(1) Data collection and control systems and equipments envisaged will be primarily for shore-based ELINT activities for an interim system. Substantial requirements exist, however, for receipt of electronic intercept data from satellite directly by mobile platforms (ships and airborne vehicles) and rapid processing on board.

(2) Maximum security should be provided to prevent furnishing intelligence to the enemy and should have minimum susceptibility to countermeasures.

(3) Reliability shall be a paramount feature of the system.

(4) Employ modular techniques whenever feasible.

(5) System should automatically intercept, collect, record, and relay to control and processing sites, data on electronic emissions.

(a) Frequency
(b) Pulse repetition rate
(c) Pulse width and modulation
(d) Antenna scan rate, pattern and beam structures
(e) Polarization
(f) Location of emission.

(6) Any shipboard equipment required should be designed for all Naval environments.

(7) The system should be designed so as to use all or any existing sites and electronic reconnaissance equipment whenever desired.

(8) This system should not only furnish, at an early date, the desired intelligence data, but also valuable information for design and development of future collecting, relaying, recording, and processing equipment.

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e. Weight and space limitations

(1) Cognizance must be taken of weight and size limitations imposed by maximum payload which existing combinations of rocketry can place in orbit.

f. Special environmental limitations

(1) It will be necessary to obtain necessary frequency clearances for the data link portion of the system as set forth in OPNAV Instruction 02410.8,

g. General information

(1) In all material developments, the Chief of Naval Operations considers timely availability and suitability of first importance. Considerations of cost, critical materials, and manpower are of almost equal importance. The performance figures given in this requirement are goals, except where specifically noted as minimums. During the course of planning for this development, it may be found that in meeting these goals a large and complex or costly article will result; whereas it may be found possible to develop a much simpler and therefore more readily available reliable, and suitable equipment short of the ultimate specific, but which nevertheless will constitute a considerable advance over presently available equipment. Determination and notification of such alternatives should be considered an essential part of the preparation of the Technical Development Plan. In submission of the Technical Development Plan, the developing agency shall inform the Chief of Naval Operations or Commandant of the Marine Corps, as appropriate, of the results, with respect to the factors enumerated above, in order that consideration may be given to making an appropriate modification of this Operational Requirement.

3. SUPPORTING DATA AND RECOMMENDATIONS:

a. ELCOM 9.4/5, SECRET, 19 June '58 - U.S. ELINT Objectives and General Intelligence Requirements.

b. USIB ELINT Committee memo SIB 0004 of 24 Feb 59 - Project TATTLETALE Objectives.

c. U. S. Specific ELINT Collection Requirements (SpECor) of 1 July 1957.

d. NRL Report TS-2293 of 17 Dec 1958 - Project TATTLETALE.

4. PRESENT EQUIPMENT AFFECTED:

None at this time.

5. TRAINING AND PERSONNEL CONSIDERATIONS:

The developing agency shall give the utmost considerations to training and personnel requirements peculiar to this system during research and development.

6. MATERIAL UNDER DEVELOPMENT

a. Project VANGUARD (NASA).
b. NRL Electronic Research Program.

c. NRL TATTLETALE Project - NRL Report TS-2293 of 17 Dec 58.
d. POLARIS, ATLAS, THOR, DISCOVERER, SATURN, TITAN, JUPITER, and NOVA boosters.
e. SENTRY Project - ARPA.
f. NOTS IDP 367, Study of 18 Nov 1957.
g. Military Satellite Tracking System (NRL).

7. RESEARCH CONSIDERATIONS:

a. Existing technology and know-how permit satisfying the basic requirements without any additional basic research. Components required for this operational requirement have already been developed and used in other systems. Component improvement will require applied research and development.

b. The Air Force and Army have a similar requirement. Close liaison and exchange of information must be maintained with the Air Force and Army.

c. Additional research is required to increase the payload which now can be placed in orbit and to improve other system components and to adapt receiver equipment to shipboard use.

d. Research and development work in achieving this requirement is subject to the provisions of DOD Directive No. 3200.5 of 19 May 1958 and enclosures thereto which in part states that the Director, ARPA will have exclusive authority in this field. Also applicable are three memoranda from the Director, ARPA to the Service Secretaries dated 30 July 1958, 26 August 1958 and 3 March 1959 which authorizes the Military Departments to enter into contracts for exploratory studies and feasibility investigations in ARPA project area within certain monetary limitations.

8. INTERIM READINESS:

Existing methods, equipment, and technology will meet the demands of interim situations falling within this requirement.

9. DATE COMPLETION OF DEVELOPMENT IS REQUIRED:

a. An interim "S" or "X" Band Satellite ELINT system is required by mid-calendar 1959 or as soon thereafter as possible.

b. Dates for completion of specific systems following the interim system will be specified in the Development Characteristics or other directives.

10. PLANNING OBJECTIVE AND IMPORTANCE CLASSIFICATION:

a. Directly supports Planning Objective - IO.
b. Indirectly supports Planning Objective - AS, AD, AO, SC, CA, & EW.
c. Lead Bureau - ONR.
d. Supporting Bureaus - BUORD, BUSHIPS, BUPERS, BUAER.
e. Priority - Class 1-B.

APPROVED:

[illegible]
By direction

~~SECRET~~

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON 25, D. C.

Op-701C1/orw
Ser 00177P07

18 MAY 1959

SECRET

From: Chief of Naval Operations
To: Distribution List

Subj: Navy Research and Development Plan, Operational Requirement No. IO-09502 (Reconnaissance/Surveillance Satellite System) (U)

Ref: (a) OPNAV Instruction 3900.8 of 29 Apr 1958
(b) DOD Directive No. 5105.15 of 17 Mar 1959 with encls thereto
(c) Dir ARPA memoranda to Service Secretaries of 30 Jul 1958, 26 Aug 1958 and 3 Mar 1959

Encl: (1) Operational Requirement No. IO-09502

1. The responsibilities of the "action", "lead", or "supporting" Bureaus as defined in reference (a) are somewhat modified in the research and development programs for space systems. Reference (b) directs that the responsibility for certain research fields, including earth satellites, is exclusively assigned to the Director of the Advanced Research Projects Agency (ARPA). The Director of ARPA has, by memoranda (ref (c)), authorized the Military Departments to proceed independently in space research within certain monetary limitations.

2. The production and operation of specific equipments in space technology for naval applications remain in the province of the Navy Department. ARPA sponsored research projects will be transferred to the using service after the successful completion of an experimental demonstration of feasibility. At this change-over point ARPA responsibility ends and, for programs of naval interest, the cognizant Bureau should be prepared to undertake normal development functions.

3. Enclosure (1) has been forwarded to the Secretary of Defense for consideration by the Director of ARPA in planning his research and development program.

4. Enclosure (1) is forwarded to the Chief of the Bureau of Aeronautics as principal action addressee and to other addressees for information or such action as their interest or responsibility in support of this Operational Requirement may indicate. A request will be made to the Secretary of the Navy for designating the Bureau of Aeronautics as Lead Bureau for this Operational Requirement.

5. The Chief of the Bureau of Aeronautics is requested to review the Research and Development program now in progress in ARPA and advise the Chief of Naval Operations of the adequacy of this effort in support of naval requirements.

K S Masterson
K. S. MASTERSON
By direction

DISTRIBUTION
(See page 2)

SECRET

OPERATIONAL REQUIREMENT NO. 10-09502
RECONNAISSANCE/SURVEILLANCE SATELLITE SYSTEM

1. OPERATIONAL CONCEPT:

a. The Long Range Objectives of the Navy indicate that the missions and tasks of the naval striking forces will be directed towards the deterrence of and the conduct of limited war and of general war. The successful employment of these forces will require continuous and instantaneous reconnaissance and surveillance of ocean/sea areas, land areas of naval interest, and enemy operating bases to obtain early knowledge of the enemy intent, and extent and type of war he is preparing to fight, and the inventory and disposition of the enemy naval forces. Reconnaissance and surveillance operations, in the event of war, will provide intelligence necessary to naval commanders for early warning, strategic warning, tactical warning, deployment control, force inventory, installation inventory, and target damage assessment.

b. A method of obtaining this information during this time period is by a manned or unmanned satellite reconnaissance/surveillance system.

c. The objectives of this satellite system during this period are to constantly and instantaneously obtain reconnaissance and surveillance data not obtainable by other systems, or to supplement data obtainable by other systems and relay it directly to surface ships, submarines, aircraft, and shore stations or store the data and relay it when commanded. These receiving stations must be equipped with rapid read-out systems to permit both tactical and strategic use of the information.

2. OPERATIONAL REQUIREMENT:

The technical feasibility of establishing unmanned or manned satellites in predetermined orbits about the earth with long lifetimes opens up the possibility of establishing a system which can provide reconnaissance and surveillance information in future years which is either not obtainable by other known systems, nor can be obtained in advance of other known systems. The concept of naval operations establishes an operational requirement for research and development of satellite reconnaissance/surveillance systems and equipments to support, both limited and general war during the period 1965-1975.

a. Functions required to be performed:

(1) In the advent of hostilities it is assumed that the enemy capabilities will be approximately the same as our own. It must be assumed that operations will involve forces about whose disposition, strength, movements, and build-up little is known. This information, as well as details of land targets of naval interest, is required to prevent destruction of our forces by surprise attack; to provide early warning; tactical warning, and strategic warning; to maintain up-to-the minute surveillance of actual combat; to provide target damage assessment; and to provide commanders with vital information on which to base tactical and strategic decisions.

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON 25, D. C.

Op-701C1/orw
Ser 00177P07

18 MAY 1959

SECRET

From: Chief of Naval Operations
To: Distribution List

Subj: Navy Research and Development Plan, Operational Requirement No. IO-09502 (Reconnaissance/Surveillance Satellite System) (U)

Ref: (a) OPNAV Instruction 3900.8 of 29 Apr 1958
(b) DOD Directive No. 5105.15 of 17 Mar 1959 with encls thereto
(c) Dir ARPA memoranda to Service Secretaries of 30 Jul 1958, 26 Aug 1958 and 3 Mar 1959

Encl: (1) Operational Requirement No. IO-09502

1. The responsibilities of the "action", "lead", or "supporting" Bureaus as defined in reference (a) are somewhat modified in the research and development programs for space systems. Reference (b) directs that the responsibility for certain research fields, including earth satellites, is exclusively assigned to the Director of the Advanced Research Projects Agency (ARPA). The Director of ARPA has, by memoranda (ref (c)), authorized the Military Departments to proceed independently in space research within certain monetary limitations.

2. The production and operation of specific equipments in space technology for naval applications remain in the province of the Navy Department. ARPA sponsored research projects will be transferred to the using service after the successful completion of an experimental demonstration of feasibility. At this change-over point ARPA responsibility ends and, for programs of naval interest, the cognizant Bureau should be prepared to undertake normal development functions.

3. Enclosure (1) has been forwarded to the Secretary of Defense for consideration by the Director of ARPA in planning his research and development program.

4. Enclosure (1) is forwarded to the Chief of the Bureau of Aeronautics as principal action addressee and to other addressees for information or such action as their interest or responsibility in support of this Operational Requirement may indicate. A request will be made to the Secretary of the Navy for designating the Bureau of Aeronautics as Lead Bureau for this Operational Requirement.

5. The Chief of the Bureau of Aeronautics is requested to review the Research and Development program now in progress in ARPA and advise the Chief of Naval Operations of the adequacy of this effort in support of naval requirements.

K S Masterson
K. S. MASTERSON
By direction

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(See page 2)

SECRET

DS 59-4432

OPERATIONAL REQUIREMENT NO. 10-30502
RECONNAISSANCE/SURVEILLANCE SATELLITE SYSTEM

1. OPERATIONAL CONCEPT:

a. The Long Range Objectives of the Navy indicate that the missions and tasks of the naval striking forces will be directed towards the deterrence of and the conduct of limited war and of general war. The successful employment of these forces will require continuous and instantaneous reconnaissance and surveillance of ocean/sea areas, land areas of naval interest, and enemy operating bases to obtain early knowledge of the enemy intent, and extent and type of war he is preparing to fight, and the inventory and disposition of the enemy naval forces. Reconnaissance and surveillance operations, in the event of war, will provide intelligence necessary to naval commanders for early warning, strategic warning, tactical warning, deployment control, force inventory, installation inventory, and target damage assessment.

b. A method of obtaining this information during this time period is by a manned or unmanned satellite reconnaissance/surveillance system.

c. The objectives of this satellite system during this period are to constantly and instantaneously obtain reconnaissance and surveillance data not obtainable by other systems, or to supplement data obtainable by other systems and relay it directly to surface ships, submarines, aircraft, and shore stations or store the data and relay it when commanded. These receiving stations must be equipped with rapid read-out systems to permit both tactical and strategic use of the information.

2. OPERATIONAL REQUIREMENT:

The technical feasibility of establishing unmanned or manned satellites in predetermined orbits about the earth with long lifetimes opens up the possibility of establishing a system which can provide reconnaissance and surveillance information in future years which is either not obtainable by other known systems, nor can be obtained in advance of other known systems. The concept of naval operations establishes an operational requirement for research and development of satellite reconnaissance/surveillance systems and equipments to support, both limited and general war during the period 1965-1975.

a. Functions required to be performed:

(1) In the advent of hostilities it is assumed that the enemy capabilities will be approximately the same as our own. It must be assumed that operations will involve forces about whose disposition, strength, movements, and build-up little is known. This information, as well as details of land targets of naval interest, is required to prevent destruction of our forces by surprise attack; to provide early warning; tactical warning, and strategic warning; to maintain up-to-the minute surveillance of actual combat; to provide target damage assessment; and to provide commanders with vital information on which to base tactical and strategic decisions.

(2) This system should be ultimately capable of placing unmanned or manned satellites in orbit which are capable by both passive and active means, under all weather conditions, of maintaining a continuous and up-to-date minute surveillance of ocean and sea targets, air targets, and land targets of naval interest. This information must be capable of being

relayed to mobile stations (ship and aircraft) and land stations when commanded, or automatically and rapidly viewed, interpreted, and made available in appropriate form for the naval commander.

b. Threat:

(1) The known ability of a potential enemy to initiate a war against this country is a continuing threat. The threat steadily increases as it becomes outwardly apparent that an enemy's capabilities for conducting war are increasing. To effectively counter this threat, detailed intelligence concerning his war making plans and potential are required. The reconnaissance/surveillance systems needed to provide this information shall consist of a number of components which, when used together, provide a completely comprehensive, day and night, operable in all-weather, system.

c. Performance and limitations:

(1) Operational performance requirements will be prescribed in the Development Characteristics.

d. Features of desired development work:

(1) System should be capable of night and day operations under all weather conditions.

(2) Ultimate system should be capable of integrating any or all methods of active or passive sensor techniques:

(a) Visual/Optical
(b) Radar
(c) Infra-red
(d) Electronic Intercept
(e) Acoustics
(f) Sonics
(g) Nuclear Sniffers
(h) Other

(3) Sensor systems must be developed which will provide for the detection, location, and identification of sea, land, and air targets of naval interest.

(4) Maximum security should be provided to prevent furnishing intelligence to the enemy and the system should have minimum susceptibility to countermeasures.

(5) Reliability shall be a paramount feature of the system.

(6) Employ modular techniques whenever feasible.

(7) System should be capable of rapid readout, comparison of returns from different sensors and interpretation on shipboard.

(8) System must be compatible in so far as practical with existing shipboard and aircraft equipment. Particular attention to compatibility with equipment under development for other associated systems must govern design criteria.

e. Weight and space limitations:

(1) Cognizance must be taken of weight and size limitations imposed by maximum payload which combinations of rocketry can place in orbit.

(2) Weight and space limitations of ships and aircraft must be borne in mind in the design of equipment for them.

f. Special environmental limitations:

(1) It will be necessary to obtain frequency clearance for active detectors and the relay portions of the system, if new frequencies are utilized.

g. General Information:

(1) In all material developments, the Chief of Naval Operations considers timely availability and suitability of first importance. Considerations of cost, critical materials, and manpower are of almost equal importance. The performance figures given in this requirement are goals except where specifically noted as minimums. During the course of preliminary design or development, it may be found that in meeting these goals, a large and complex or costly article will result; whereas it may be found possible to develop a much simpler and therefore more readily available, reliable, and suitable equipment short of the ultimate specified, but which nevertheless will constitute a considerable advance over presently available equipment. Determination of such alternatives should be considered essential in the preparation of the Technical Development Plan required in response to this Operational Requirement.

3. SUPPORTING DATA AND RECOMMENDATIONS:

a. Past experience has shown that reconnaissance and surveillance, particularly of the photographic variety, has been a superior and accurate means of obtaining necessary intelligence on the enemy forces and installations. Because of the rapid pace at which modern warfare may take place and the possibility of a surprise attack it is essential that reconnaissance and surveillance data of high quality be available to naval commands constantly and quickly in order to immediately interpret and evaluate the military situation.

b. CNO Ser 004P93 of 24 Feb 59 (LRO-59) states the requirement for reconnaissance during the 1969-74 period.

c. COMNAVAIRLANT Ser 50/01807 of 2 Nov 53 states that existing photographic aircraft are deficient.

d. Joint ltr COMSIXTHFLT Ser 0031/2 and COMSECONDFLT Ser 0022 of 15 Feb 1958 states that there is a weakness in reconnaissance capability.

e. ONR Report "A preliminary Discussion of the Technical Operating Problems of a Reconnaissance Satellite" dtd March 1958.

4. PRESENT EQUIPMENT AFFECTED:

None at this time.

5. **MATERIAL UNDER DEVELOPMENT:**

a. NRL Report TS-2293 of 17 Dec 1958 - Project TATTLETALE proposal.
b. Project SENTRY - ARPA.
c. NOTS Report IDP 367 of 18 Nav 1957 - Proposal for Naval Observational Television Satellite.
d. Project VANGUARD - NASA.
e. Project DISCOVERER - ARPA.
f. Doppler and Minitrack Network - NRL & BRL.
g. A-101 RECON System - BUAER.
h. POLARIS, ATLAS, THOR, JUPITER, TITAN, SCOUT, NOVA CENTAUR booster programs.
i. Project TIROS - ARPA.
j. Navy Tactical Data System - BUSHIPS.
k. Project SALAAM - Army.

6. **TRAINING AND PERSONNEL CONSIDERATIONS:**

The developing agencies concerned shall give the utmost consideration to training and personnel requirements peculiar to the reconnaissance/surveillance satellite system and shall define in the earliest planning stages the unique and unusual personnel talents required. Every effort shall be made during design planning to minimize the additional fleet training requirements.

7. **RESEARCH CONSIDERATIONS:**

a. Existing technology and know-how permit only partial fulfillment of this requirement. Additional feasibility studies and research and development are required to satisfy this requirement particularly in the field of sensor development, relay systems, and read-out and interpretation systems, satellite vehicles, and satellite power supplies.

b. The Air Force and Army have a similar requirement. Close liaison and exchange of information must be maintained with the Air Force and Army, and duplication of costly parallel projects must be avoided.

c. Research and Development work in achieving this requirement is subject to the provisions of DOD Directive No. 5105.15 of 17 Mar 1959 and enclosures thereto which in part states that the Director, ARPA will have exclusive authority in this field. Also applicable are three memoranda from the Director, ARPA to the Service Secretaries dated 30 July 1958, 26 August 1958 and 3 March 1959 which authorize the Military Departments to enter into contracts for exploratory studies and feasibility investigations in ARPA project area within certain monetary limitations.

8. **INTERIM READINESS:**

a. Existing developments will not satisfy this requirement.

b. An interim capability only partially satisfying this requirement with a single high resolution sensor and a minimum useful life of 6 months is acceptable.

9. **DATE COMPLETION OF DEVELOPMENT IS REQUIRED:**

a. The need exists for the reconnaissance/surveillance satellite system to be employed immediately. Acceptable completion dates will be indicated upon receipt of a Technical Development Plan for the Lead Bureau.

10. PLANNING OBJECTIVE AND IMPORTANCE [illegible]

a. Directly supports Planning Objective [illegible]

b. Indirectly supports Planning Objective [illegible]

c. Lead Bureau - BUAER.

d. Supporting Bureaus - BUORD, BUSHIPS, ONR.

e. Importance Classification - 1-A.

APPROVED:

R. S. MASTERSON
By direction